

**FACT SHEET FOR NPDES PERMIT
NO. WA-005233-8**

CITY OF TONASKET

DATE OF THIS FACT SHEET:

DATE OF EXPIRING PERMIT:

SUMMARY

The City of Tonasket constructed an extended aeration activated sludge “Biolac” wastewater treatment system to replace its older lagoon facility. Operation of the new facility commenced in 2001. Inflow and Infiltration,(I&I), was estimated to be 32,000 gpd, primarily consisting of infiltration prior to implementing the City’s priority sewer replacement project beginning in 2001-2002. Infiltration was approximately 15% of total hydraulic loading and exceeded the EPA's peak infiltration guideline limits. The City’s General Sewer Plan and Wastewater Facility Plan included a schedule to reduce infiltration into the collection system. This schedule replaced the high priority sewers during 2001 to 2002. The City's NPDES permit application for permit renewal states the replacement plan reduced I&I down to approximately 20,000 gpd.

Groundwater monitoring has been conducted since 1997. Following completion of the facility upgrade in 2001, the Permittee ceased operation of the sprayfield. The State Wastewater permit that allowed discharge to the sprayfield was cancelled effective July 1, 2001. Since that time the site has been restored and the lagoons filled in. Surface grading and landscaping has been completed. Monitoring at well # 5 will be suspended during the proposed permit term. Monitoring of background levels at well #6 and wells # 1 and #3 in close proximity of the Okanogan River will continue to be monitored for Nitrate, Total Kjeldahl Nitrogen, Chloride, Temperature, pH, Conductivity and Water Level.

Under Section 303 (d) of the Federal Clean Water Act, the Okanogan River and several tributaries have been listed by Washington State for non-attainment of the EPA human health criteria for DDT and PCBs in edible fish tissue and for non-attainment of the Washington State chronic criteria for DDT in water. The Permittee will be required to sample the sludge and wastewater for DDT and PCBs. In the event of a positive test for either DDT or PCBs, the Permittee will be required to follow a Schedule of Compliance to determine the source of DDT and PCBs in its collection system.

Performance-based limits for Biological Oxygen Demand (BOD) and Total Suspended Solids (TSS) are contained in the proposed permit. Technological limits for pH and Fecal Coliform are retained in the proposed permit. Temperature and Ammonia limits have been discontinued due to a determination of no reasonable potential to violate the water quality standards.

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INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the State of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant:	City of Tonasket
Facility Name and Address:	City of Tonasket Wastewater Treatment Plant 500 Railroad Avenue
Type of Treatment:	Extended Aeration Activated Sludge
Discharge #001 Location:	Latitude: 48° 42' 09" N. Longitude: 119° 26' 55" W.
Water Body Name and ID Number:	Waterbody Name: Okanogan River Waterbody ID Number: WA-49-1020 Old

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

History

Due to the pre-existing facility's inability to effectively meet the state discharge permit limits for groundwater discharge and to meet the needs of the growing population, the City constructed an extended aeration activated sludge "Biolac" wastewater treatment system to replace the existing facultative lagoon facility. Operation of the new facility commenced in 2001.

Collection System Status

The municipal collection system was built in 1947 and contained approximately 5.8 miles of three-foot segments of concrete pipe with grouted joints. In 1976, when the original trickling filter plant was removed, the main lift station was installed and the influent piping was replaced. The sewer lines on Fourth Street were replaced in 1991. In 1993 approximately 0.7 miles of the concrete sewer was replaced by PVC pipe due to severe and frequent clogging by roots. An additional 1,600 feet of sewer line is classified by the City as "high maintenance," in constant need of cleaning. In 1995 a flow meter was installed to meter the influent at the discharge end of the lift station. The industrial effluent from one industrial user feeds into the collection system at 1st Street and Western Avenue (Smith-Nelson), and Regal discharges to the main sewer line at Railroad Avenue.

Parry's Acreage

Parry's Acreage is located west of the POTW across the Okanogan River. The wastewater is pumped under the Okanogan River to the POTW. Okanogan County has owned and operated the Parry's Acreage collection system since the early 1980's when the original gravity system was constructed. This portion of the system utilizes two lift stations, a flow meter and serves 96 residences with an average flow of 15,000 gallons per day (gpd). An agreement between the City and Okanogan County controls the operation of the system and limits the maximum flow to the POTW to 20,000 gpd and 101 residential hookups. Maintenance of the system was the responsibility of the County. The City is in the process of acquiring ownership of Parry's Acreage system from the county.

Infiltration and Inflow

Inflow and Infiltration (I&I), was estimated to be 32,000 gpd, primarily consisting of infiltration prior to implementing the City's priority sewer replacement project beginning in 2001-2002. Infiltration was approximately 15% of total hydraulic loading and exceeded the EPA's peak infiltration guideline limits. The City's General Sewer Plan and Wastewater Facility Plan included a schedule to reduce infiltration into the collection system. This schedule replaced the high priority sewers during 2001 to 2002. The recent NPDES permit application for permit renewal received from the City states the replacement plan reduced I&I down to approximately 20,000 gpd.

The proposed permit will require the submittal of an I&I report with the City's application for permit renewal.

Treatment Process

The headworks are located in the process building and incorporate a parshall flume for flow metering. Preliminary screening consists of in-channel, self-cleaning bar screen.

The treatment process is a newly constructed, extended aeration, activated sludge system. The "Biolac" biological treatment system consists of a 45 mil polypropylene geomembrane lined earth aeration basin with a capacity of approximately 408,000 gallons. It utilizes two 15 horse power blowers, plus one for back-up. This system promotes mixing action using suspended aerators. The clarifier is approximately 55 by 25 by 12 feet deep and is piped to return activated sludge to the aeration basin and waste activated sludge to lagoon cell #1. Cell #1 has been relined and has a capacity of 400,000 gallons at a depth of three feet. Cell #1 will provide capacity for twenty years of wasted sludge storage estimating annual sludge production between 200 and 300 pounds per day.

The disinfection system is an ultra violet, UV, system located in the process building. This system is designed with two equal process trains, each capable of treating 0.6 million gallons per day, (mgd). Both systems will be needed when treating peak hour flow rates. According to the *City of Tonasket General Sewer Plan and Wastewater Facilities Plan*, July 1998, page 6.7, hard water and the possibility of lignin sulfonate in the influent wastewater stream are concerns because of their potential to interfere with operation of the UV disinfection system.

The staffing requirements increased for the new facility, requiring at least a ¾ time position for operations, maintenance and laboratory work. The lead operator is to be certified at class II level.

The City accepts wastewater from two industrial users listed in their application for the discharge permit, Smith-Nelson fruit packing and Bluebird, Inc. Smith-Nelson contributes approximately 3000 gpd of process wastewater and an additional 3600 gallons per day (gpd) of non-contact cooling water. Bluebird, Inc. contributes approximately 3,500 gpd, of non-contact cooling water. Both of these industrial users discharge wastewater to the City on a seasonal, intermittent basis. Both industrial users are regulated under fresh fruit packing general permits. The Tonasket POTW provides secondary level wastewater treatment.

Discharge Outfall

Secondary treated and disinfected effluent is discharged from the facility into the Okanogan River at approximately River Mile 56.5. The submerged discharge is located 800 feet from the treatment plant. It is approximately 85 feet from the shore and lies on the river bottom from 2 to 10 feet below the surface of the river.

Residual Solids

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings) in addition, incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum and screenings are drained and disposed of as solid waste at the local landfill.

On August 26, 1997, representatives of the City's consulting engineers determined sludge and water depths at representative points. The sampling indicated that there is approximately 12,000 cubic yards of sludge accumulated in the ponds, which would, after dewatering, require approximately 40 - 50 acres for land application. Sludge samples from ponds #2 and #3 were also collected and sent to an outside laboratory for analyses of 40 CFR Part 503 regulated constituents, which will govern sludge disposal by land application. The trace element

concentrations, based on the samples collected, were determined to be low enough to meet the "exceptional quality" designation of the federal regulations.

A Washington State General Biosolids permit is required for biosolids management in accordance with Chapter 173-308 WAC.

PERMIT STATUS

The previous permit for this facility was issued on June 8, 2001 and it became effective on July 1, 2001. The previous permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD₅), Total Suspended Solids (TSS), pH, Fecal Coliform bacteria, Residual Chlorine and Ammonia.

An application for permit renewal was submitted to the Department on September 30, 2005 and accepted by the Department on October 4, 2005.

The City has fenced all of the area in cell #1 and will keep cell #4 for backup. Cells # 2,3,5,6 and 7 have be abandoned, demolished, filled in and landscaped into sport fields.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

The facility received its last inspection on August 23, 2005. This was an inspection without sampling. The facility appeared to be in excellent operating order. The current permit is due to expire on June 30, 2006. During the course of the permit the facility has been in substantial compliance with the conditions of the permit.

WASTEWATER CHARACTERIZATION

Influent

The influent is characterized in Table 1:

Table 1:
Influent Characterization Compared to
POTW Design Criteria

Parameter	Units	Design Criteria	Cumulative Monthly Average ¹		Maximum Average Monthly ²	
			Current Value Jan. 2003 to June 2005	% of Design	Current Value Jan. 2003 to June 2005	% of Design
Flow	MGD	0.40	0.14	35	0.18	45
BOD ₅	mg/L	NA ³	127.4	NA	205.8	NA
BOD ₅	lbs/Day	720	182.4	25.3	292	40.6
TSS	mg/L	NA	128	NA	242	NA
TSS	lbs/Day	550	182	33.1	371	67.5

¹ The Monthly Average is based on the arithmetic mean of the DMRs reported for the past three years.

² Maximum Monthly Average is the highest monthly average reported in the last 3 years from Jan. 2003 thru June 2005.

³ "NA" means not applicable.

Effluent

Table 2 contains a comparison of the effluent parameters reported this current permit term, January 2003 to June 2005, with the current permit limitations.

Table 2:
Effluent Characterization from January 2003 to June 2005
Compared to the Current Permit Limitations

Parameter	Units	Avg. Mo. Existing Permit Limits	3 Year Monthly Average ¹		Average Monthly Maximum/Minimum ²	
			Current Value	% of Permit Limit	Current Value	% of Permit Limit
BOD₅	mg/L	30	6.5	21.7	12 (Max)	40
BOD₅	lb./Day	92	8.2	8.6	17 (Max)	17.9
BOD₅ % Removal	lb./Day	> 85	94.3	110	89 (Min)	105
Fecal Coliform Bacteria	# colonies per 100 ml	200	3.5	1.8	19 (Max)	9.5
pH	Std. Units		NA	NA	8.2 (Max) 6.9 (Min)	NA
TSS	mg/L	30	6.3	21	15.8 (Max)	NA
TSS	lb./Day	72	7.7	10.7	23 (Max)	31.9
Temperature (Summer)	° Celsius		22.0	NA	23.5 (Max)	NA
Hardness	mg/L		199	NA	300 (Max)	NA
Ammonia	mg/L	5.8	0.17	2.9	3.0 (Max)	52
Ammonia	lbs/Day	16	0.32	2	1.94 (Max)	12.1

¹ The Monthly Average is based on the arithmetic mean of the DMRs reported for the past three years.

² Maximum Monthly Average is the highest monthly average reported in the last 3 years from Jan. 2003 thru June 2005.

³ "NA" means not applicable

GROUNDWATER

Groundwater monitoring has been conducted since 1997. Following completion of the facility upgrade in 2001, the Permittee ceased operation of the infiltration lagoon. The State Wastewater

permit that allowed discharge to the ground was cancelled effective July 1, 2001. Since that time the site has been restored and the lagoons filled in. Surface grading and landscaping has been completed.

Figure 1: Chloride, TDS, Nitrogen and Nitrate Trends at Monitoring Well #1

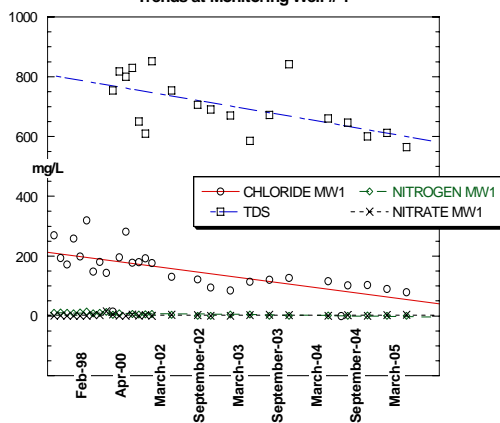


Figure 2: Chloride, TDS, Nitrogen and Nitrate Trends at Monitoring Well #3

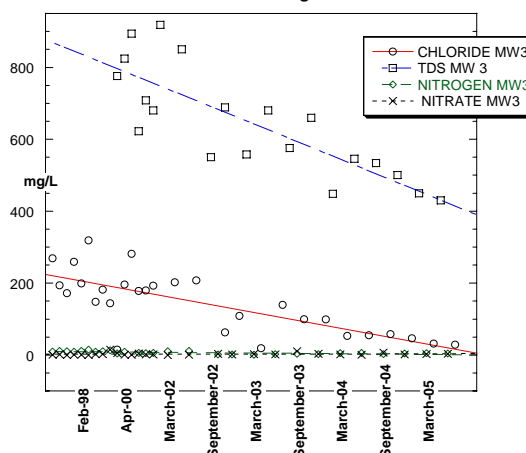


Figure 3: Chloride, TDS, Nitrogen and Nitrate Trends at Monitoring Well #5

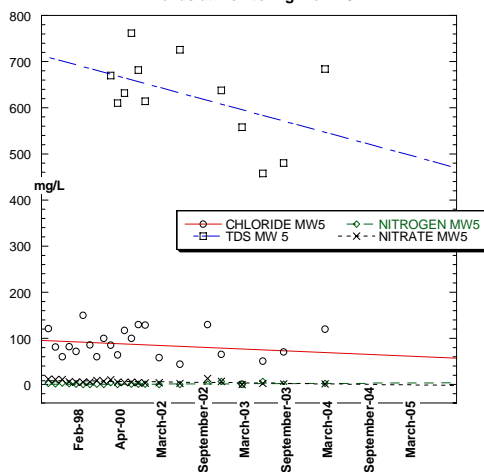
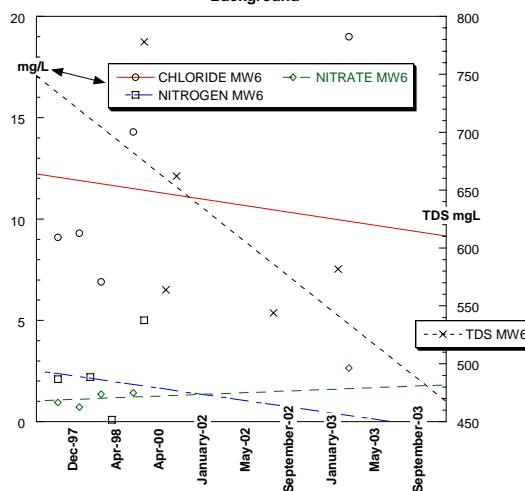


Figure 4: Chloride, TDS, Nitrogen and Nitrate Trends at Monitoring Well #6 Background



Monitoring at four locations in the proximity of the site indicate groundwater quality has been impacted by the lagoons, which have been decommissioned. Chloride data gathered since 1998 at wells #1, #3 and #5 exhibit average chloride concentrations below the groundwater quality criteria of 250 mg/L but 8 to 15 times that of the background concentration of 11.4 mg/L found at well #6. The data at all four wells show a downward trend over time. The Total Dissolved Solids (TDS) averaged concentrations however are high for all four wells. The concentrations exceed the groundwater criteria of 500 mg/L. The background TDS averaged value since 1998 was 626 mg/L at well # 6. The highest value was 701 mg TDS/L at well# 1. Nitrate and Total Kjeldahl Nitrogen trends are relatively flat over time. Nitrate levels are consistently below the groundwater criteria of 10 mg/L.

Monitoring at well # 5 will be suspended during the proposed permit term. Monitoring of background levels at well #6 and wells # 1 and #3 in close proximity of the Okanogan River will continue to be monitored for Nitrate, Total Kjeldahl Nitrogen, Chloride, Temperature, pH, Conductivity and Water Level.

SEPA COMPLIANCE

A SEPA environmental checklist was submitted in February 1998. A Determination of Non-Significance was issued on February 24, 1998.

PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in an NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) Each of these types of limits is described in more detail below, with the more stringent being chosen for each of the parameters of concern.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in

the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed Department-approved design criteria.

The design criteria for this treatment facility are taken from *The City of Tonasket General Sewer Plan and Wastewater Facilities Plan, July 1998, Varela & Associates, Inc.*, page 6.8, and are as follows:

Table 1: Design Standards for Tonasket WWTP

Parameter	Design Quantity
Average annual flow:	0.33 MGD
Maximum monthly flow:	0.41 MGD
Maximum daily flow:	0.5 MGD
Instantaneous peak flow, (hourly):	1.2 MGD
BOD ₅ influent loading, (avg. annual):	360 lb./day
TSS influent loading, (avg. annual):	275 lb./day
Design population equivalent:	1600*

* City of Tonasket General Sewer Plan and Wastewater Facilities Plan, July 1998, Varela & Associates, Inc., page 2.8.

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by Federal and State regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (Federal) and in Chapter 173-221 WAC (State). These regulations are performance standards that constitute “all known available and reasonable methods of prevention, control, and treatment” (AKART) for municipal wastewater.

The following technology-based limits for pH, fecal coliform, BOD₅, and TSS are taken from Chapter 173-221 WAC are:

Table 2: Technology-based Limits

Parameter	Limit
pH:	shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
BOD ₅ (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

Monthly effluent BOD mass loadings (lbs/day) were calculated as the maximum monthly design flow (0.41 MGD) x Concentration limit (30 mg/L) x 8.34 (conversion factor) = mass limit 102.6 BOD lbs/day.

The weekly average effluent BOD mass loading is calculated as 1.5 x monthly loading = 153.9 lbs/day.

Monthly effluent TSS mass loadings (lbs/day) were calculated as the maximum monthly design flow (0.41 MGD) x Concentration limit (30 mg/L) x 8.34 (conversion factor) = mass limit 102.6 TSS lbs/day.

The weekly average effluent TSS mass loading is calculated as 1.5 x monthly loading = 153.9 lbs/day.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

The State's Surface Water Quality Standards (Chapter 173-201A WAC) stipulate that waste discharge permits shall be conditioned such that the discharge will protect existing water quality

and preserve the designated beneficial uses of the State's surface waters, WAC 173-201A-060. Surface water quality-based effluent limitations may be based either on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

Numerical Criteria for the Protection of Aquatic Life

"Numerical" water quality-based criteria are numerical values set forth in the State's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the maximum levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria are used along with the chemical and physical data of the wastewater and receiving water in order to derive the applicable effluent limits for this permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, the water quality-based limits must be used in this permit.

Numerical Criteria for the Protection of Human Health

The EPA promulgated 91 numerical water quality-based criteria for the protection of human health that are applicable to the State (EPA 1992). These criteria are designed to protect humans from cancer and other disease, and are primarily applicable to fish/shellfish consumption and drinking water from surface waters.

Narrative Criteria

In addition to numerical criteria, "narrative" water quality-based criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) surface waters in the State.

Antidegradation

The State's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing natural water quality of the waterbody. In cases where the natural conditions of a receiving water are either of lower or higher quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. More information concerning the State's Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

Critical Conditions

Surface water quality-based limitations are derived for the waterbody's "critical" conditions, which represent the receiving water and waste discharge conditions with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic waterbody uses. These conditions may not all necessarily occur together during the same period of time.

Mixing Zones

This permit authorizes an acute and a chronic mixing zone around the point of discharge as allowed by Chapter 173-201A WAC, *Water Quality Standards for Surface Waters of the State of Washington*. The Water Quality Standards stipulate some criteria be met before a mixing zone is allowed. The requirements and Ecology's actions are summarized as follows:

1. The allowable size and location be established in a permit.

This permit specifies the size and location of the allowed mixing zone.

For this discharge, the percent volume restrictions of the Water Quality Standards resulted in a higher dilution factor than the distance and width restrictions. Therefore, the dilution factor modeled at a managed low flow and within set boundaries was used to determine reasonable potential to exceed water quality standards.

2. Fully apply "all known available and reasonable methods of treatment" (AKART).

The technology-based limitations determined to be AKART are discussed in an earlier Section of this fact sheet.

3. Consider critical discharge condition.

The critical discharge condition is often pollutant-specific or water body-specific and is discussed above.

4. Supporting information clearly indicates the mixing zone would not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with the existing or characteristic uses, result in damage to the ecosystem or adversely affect public health.

The Department of Ecology has reviewed the information on the characteristics of the discharge, receiving water characteristics and the discharge location. Based on this

information, Ecology believes this discharge does not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with existing or characteristics uses, result in damage to the ecosystem or adversely affect public health.

5. Water quality criteria shall not be violated (exceeded) outside the boundary of a mixing zone.

A reasonable potential analysis, using procedures established by USEPA and the Department of Ecology, was conducted for each pollutant to assure there will be no violations of the water quality criteria outside the boundary of a mixing zone.

6. The size of the mixing zone and the concentrations of the pollutants shall be minimized.

The size of the mixing zone (in the form of the dilution factor) has been minimized by the use of design criteria with low probability of occurrence. For example, the reasonable potential analysis used the highest pollutant concentration, the 95th percentile background concentration, the centerline dilution factor and the low flow occurring once in every 10 years. The concentrations of the pollutants in the mixing zone have been minimized by requiring pollution prevention measures where applicable.

7. Maximum size of mixing zone

The authorized mixing zone does not exceed the maximum size restriction.

8. Acute Mixing Zone

A. Acute criteria met as near to the point of discharge as practicably attainable

The acute criteria have been determined to be met at 10% of the distance of the chronic mixing zone. The acute mixing zone will extend 30.3 ft downstream of the outfall and extend 10 feet upstream of the outfall.

B. The concentration of, and duration and frequency of exposure to the discharge, will not create a barrier to migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem.

The toxicity of pollutants is dependent upon the exposure, which in turn is dependent upon the concentration and the time the organism is exposed to that concentration. For example EPA gives the acute criteria for copper as “freshwater aquatic organisms and their uses should not be affected unacceptably if the 1- hour average concentration (in

µg/l) does not exceed the numerical value given by $(0.960)(e^{(0.9422[\ln(\text{hardness})] - 1.464)})$ more than once every three years on the average.” The limited acute mixing zone authorized for this discharge will assure that it will not create a barrier to migration. The effluent from this discharge will rise as it enters the receiving water assuring that it will not cause translocation of indigenous organism near the point of discharge.

C. Comply with size restrictions

The mixing zone authorized for this discharge meets the size restrictions of WAC 173-201A.

9. Overlap of Mixing Zones

This mixing zone does not overlap another mixing zone.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

DESCRIPTION OF THE RECEIVING WATER

The facility discharges to the Okanogan River which is designated as a Class A receiving water in the vicinity of the outfall. Characteristic uses of the receiving water include the following:

water supply (domestic, industrial, agricultural); stock watering; fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation. Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

In accordance with Section 303(d) of the federal Clean Water Act, every two years each state must identify its polluted waterbodies and submit this list to EPA. These are *water quality limited* estuaries, lakes, and streams that fall short of state surface water quality standards, and are not expected to improve within the next two years. The Okanogan River is listed on the State's 303(d) list for 4,4'DDD, 4,4'DDE, Total PCBs, DO, pH and Temperature.

Surface Water Quality Criteria

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Table 6: Surface Water Quality Criteria

Fecal Coliforms	100 organisms/100 mL maximum geometric mean
Dissolved Oxygen	8 mg/L minimum
Temperature	18 degrees Celsius maximum or incremental increases above background
pH	6.5 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

Table 7 depicts the conditions used for determination of mixing zones, reasonable potential and water quality criteria discussed on the following pages.

Table 7: Critical Condition Parameters Used in Mixing Zone Analysis

Data obtained from the Facility Plan October 6, 1997	
Parameter	Value used
7Q10 flow	345 CFS
Velocity	0.64 fps
Depth	3
Width	165
Roughness (Manning)	.035
Distance from Shore	85 feet
Data obtained from Department of Ecology's EAP Stream Monitoring Website	
Temperature	10 year ¹ average 22.9°C Maximum in 10 years 24.3°C
pH (high)	95 th Percentile in 10 years. pH 8.9
Dissolved Oxygen	10 year ¹ average 8.3 mg/L Minimum in 10 years 7.4 mg/L
Total Ammonia-N	10 year ¹ average .01 mg/L Maximum in 10 years .033 mg/L
Fecal Coliform	10 year ¹ 61.5 average colonies/100ml Maximum in 10 years 242 colonies/100ml
Flow	10 year ¹ average 609 CFS Minimum in 10 years 142 CFS

Turbidity	
Design Criteria and Effluent Characteristics of POTW	
Flow Design Criteria	0.33 MGD // 0.51 CFS
Maximum Flow for Acute Dilution Factor	Maximum daily flow in three years 0.205 MGD // 0.318 CFS
Maximum Flow for Chronic Dilution Factor	Maximum monthly average in 3 years 0.172 MGD // 0.267 CFS
Temperature	Maximum Day 26.4
Dissolved Oxygen	Minimum monthly average 3.31 mg/L
Ammonia	Maximum day during Critical Season 0.170 mg/L

¹ Ten year monitoring period critical season July-September 2004 through 1995

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in this discharge exceed, or have the potential to exceed, the applicable water quality criteria even with technology-based controls which the Department has determined to be AKART. A mixing zone for this permit's discharge is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

The chronic mixing zone shall not extend upstream more than 100 feet and downstream 303 feet. The acute mixing zone shall not extend upstream more than 10 feet and downstream more than 30.3 feet. The plume width shall be no more than 7.4 feet in the acute mixing zone and 23.4 feet in the chronic mixing zone.

Dilutions factors were determine via a simple mass balance equation, RIVPLUM 5 and CORMIX-GI v4.3. The mass balance equation derived an acute dilution factor of 28.1:1 and a chronic dilution factor of 320.4:1 using 2.5% and 25% of the 7Q10 value for the Okanogan River at 345 CFS. RIVPLUM 5 yields an acute value of 28.1:1 and a chronic dilution value of 106.0:1. CORMIX yields an acute dilution of 20.5:1 and a chronic dilution value of 141.6:1. The more stringent model for the acute dilution factor is the CORMIX model. For this reason and the fact that CORMIX is viewed as the more appropriate model for shallow rivers like the Okanogan the dilution factors modeled via CORMIX will apply.

Table: 8 Acute and Chronic Dilution Factors

	Acute Dilution Factor	Chronic Dilution Factor
Aquatic Life	20.5	141.6

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants -- their adverse effects diminish rapidly with mixing in a receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs at some distance away from the discharge, even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which a pollutant of concern has its maximum effect. Since the point of the POTW discharge lies in the segment of the Okanogan River listed on the State's 303(d) list for temperature and DO, effluent data from the new facility will be reviewed for reasonable potential, which could lead to temperature and DO limits in a proposed permit.

Temperature

WAC 173-201A-130(21) establishes a temperature criteria of 18.0°C for this Class A segment of the Okanogan River and details 2 tests to demonstrate compliance. The regulation states: When natural conditions exceed 18.0°C, no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3°C; nor shall such temperature increases, at any time, exceed $t = 28/(T+7)$. The point of compliance for temperature is at the edge of the chronic mixing zone.

1. No temperature increase . . . greater than 0.3 °C

Utilizing a simple mass balance calculation, and assuming a chronic dilution factor of 141.6, an effluent temperature of 25.6°C, and the highest ambient temperature reported in the last ten years of 26.4°C, the calculated temperature at the edge of the mixing zone is 26.394°C. The net temperature decrease is 0.006°C, which is significantly less than the allowable 0.3°C. The effluent temperature used was the highest Maximum Day value observed during the last 3 summers.

2. Temperature increase shall not exceed $t = 28/(T+7)$

$$t = 28/(17.9 + 7)$$

$$t = 1.12^{\circ}\text{C}$$
$$0.054^{\circ}\text{C} < 1.12^{\circ}\text{C}$$

Utilizing a simple mass balance calculation, and assuming a chronic dilution factor of 141.6, an effluent temperature of 25.6°C, and an ambient temperature just below the criterion at 17.9°C, the calculated temperature at the edge of the mixing zone is 17.954°C. The net temperature rise is 0.054°C, which is significantly less than the allowable 1.12°C. The effluent temperature used was the highest Maximum Day value observed during the last 3 summers.

The above calculations illustrate the unlikelihood of a violation of the water quality standard and therefore, the temperature effluent limit has been eliminated from the permit.

pH

The impact of pH was modeled using the calculations from EPA, 1988. The input variables were a dilution factor 141.6, an upstream temperature of 26.4°C, an upstream pH of 8.9, an upstream alkalinity of 50 mg/L as CaCO₃, an effluent temperature of 25.6°C, an effluent pH of 6, an effluent pH of 9, and an estimated effluent alkalinity of 199mg/L as CaCO₃. Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters with the technology-based limit. Therefore, the technology-based effluent limitation for pH was placed into the proposed permit.

Fecal coliform bacteria

The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 200 organisms per 100 ml and a dilution factor of 141.6. Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters with the technology-based limit. Therefore, the technology-based effluent limitation for fecal coliform bacteria was placed into the proposed permit.

Toxic Pollutants

Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria of the receiving water. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

Ammonia was determined to be the only toxic present in the POTW discharge and a determination of the reasonable potential for this toxic to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 at the critical condition, which in this case typically occurs during late summer. However, the Department determined that there was no reasonable potential for ammonia to cause a violation of Water Quality Standards and therefore no ammonia limit will be required.

Whole Effluent Toxicity

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing.

Toxicity caused by unidentified pollutants is not expected in the effluent from this discharge as determined by the screening criteria given in Chapter 173-205 WAC. Therefore, no whole effluent toxicity testing is required in this permit. The Department may require effluent toxicity testing in the future if it receives information that toxicity may be present in this effluent.

Human Health

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992). The Department has determined that the applicant's discharge is unlikely to contain chemicals regulated for human health.

Sediment Quality

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has been unable to determine at this time the potential for this discharge to cause a violation of sediment quality standards. If the Department determines in the future that there is a potential for violation of the Sediment Quality Standards, an order will be issued to

require the Permittee to demonstrate that either the point of discharge is not an area of deposition or, if the point of discharge is a depositional area, that there is not an accumulation of toxics in the sediments.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect beneficial uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

Monitoring for Flow, Temperature, pH, BOD, TSS, Fecal Coliform Bacteria, Ammonia Nitrogen, Total Kjeldahl Nitrogen, Dissolved Oxygen, Total Phosphorus and Total Hardness are being required to further characterize the effluent.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Sludge monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

Groundwater monitoring has been conducted since 1997. Following completion of the facility upgrade in 2001, the Permittee ceased operation of the sprayfield. The State Wastewater permit that allowed discharge to the sprayfield was cancelled effective July 1, 2001. Since that time the site has been restored and the lagoons filled in. Surface grading and landscaping has been completed. Monitoring will be continued in the proposed permit for reasons discussed earlier in the fact sheet.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (July 1994) for a POTW.

TMDL

Under Section 303 (d) of the Federal Clean Water Act, the Okanogan River and several tributaries have been listed by Washington State for non-attainment of the EPA human health criteria for DDT and PCBs in edible fish tissue and for non-attainment of the Washington State chronic criteria for DDT in water. As a result, a Total Maximum Daily Load (TMDL) project was conducted for the Okanogan River. The TMDL was approved by EPA on February 1, 2005. The goal of the TMDL is to meet water quality standards in surface waters and human health criteria in fish tissue by the year 2054.

At the time the TMDL study was conducted, the City of Tonasket was not discharging to the river and therefore the City was not sampled during the Department's study to determine the loading contribution of DDT and PCBs originating from sewerage treatment plant point source discharges. The Cities of Okanogan, Omak and Oroville participated in the study to determine load levels of DDT in the effluent and PCB contained in the sludge at the wastewater treatment plants. DDT and PCB loads are consistently lower than the Waste Load Allocations (WLAs) that were derived from design flow criteria and criteria concentrations for DDT and PCBs. Without benefit of sampling, a WLA for Tonasket has been determined. It is expected that any loads will be below the WLA as has been the case with Omak, Okanogan and Oroville.

Table 9 contains the WLAs for the cities affected by the Lower Okanogan River Basin DDT and PCBs TMDL. (October 2004, Publication Number 04-10-043)

Table 9: Wasteload Allocations

STP	RM *	Design Flow (I/s)	4,4'-DDE	4,4'-DDD	4,4'-DDT	t-DDT	t-PCB
Oroville ^a	^e	21.6	1.1	1.6	1.1	1.9	0.3
Omak ^b	29.9	82.8	4.2	6.0	4.2	7.2	1.2
Okanogan ^c	24.8	23.7	1.2	1.7	1.2	2.0	0.3
Tonasket ^d	56.4	17.5	0.9	1.3	0.9	1.5	0.5
		Criteria (ng/L					

* RM means River mile

a NPDES permit WA-002239-0

b NPDES permit WA-002094-0

c NPDES permit WA-002236

d NPDES permit WA-005233-7

e Similkameen River mile 4.0. The Similkameen River enters at Okanogan River mile 74.1.

In the best professional judgment of the Department, establishment of effluent limits for DDT and PCBs are not appropriate at this time, for several reasons. First, the Detailed Implementation Plan for the approved TMDL is not finished. Second, it is difficult to establish effluent limits based on limited or no sampling. The Department generally considers 6-8 samples to be the

minimum for statistical validity. Third, DDT has been banned in this country since 1972 and PCB since 1976, and the Department feels it is not appropriate to establish effluent limits for illegal substances. The Department believes the most desirable outcome for this situation is to identify, reduce and, if possible eliminate them from entering the POTW.

The Permittee will be required to sample the sludge and wastewater for DDT and PCBs. In the event of a positive test for either DDT or PCBs, the Permittee will be required to follow a Schedule of Compliance to determine the source of DDT and PCB in its collection system. The Schedule of Compliance is intended to be fulfilled by the end of the permit cycle. The City is required to submit a Scope of Work, which describes the strategy and methodology of the study, followed by twice-per-year progress reports. The Final Report of the study is due with the next application for permit renewal.

If in the initial screening of the sludge or wastewater, tests results are non-detectable for PCB and DDT, the Permittee will be required to sample again 6 months later. If the results of the second analysis are also negative, then the Permittee will be required to submit a recent analysis with its application for permit renewal. A second negative test for PCB and DDT in the wastewater and sludge will render the Schedule of Compliance moot for the proposed permit term.

LAB ACCREDITATION

With the exception of certain parameters this permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The laboratory at this facility is not currently accredited.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in proposed permit requirement S.4. to plan expansions or modifications

before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S.4. restricts the amount of flow.

OPERATION AND MAINTENANCE (O&M)

The proposed permit contains condition S.5. as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

RESIDUAL SOLIDS HANDLING

To prevent water quality problems the Permittee is required in permit condition S7. to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under Chapter 70.95J RCW, Chapter 173-308 WAC "Biosolids Management", and Chapter 173-350 WAC "Solid Waste Handling Standards". The Permittee holds Biosolids Permit number BA-0021938 and may dispose of its biosolids at an approved beneficial-use land disposal site.

PRETREATMENT

An industrial user survey may be required to determine the extent of compliance of all industrial users of the sanitary sewer and wastewater treatment facility with federal pretreatment regulations (40 CFR Part 403 and Sections 307(b) and 308 of the Clean Water Act), with state regulations (Chapter 90.48 RCW and Chapter 173-216 WAC), and with local ordinances.

As sufficient data becomes available, the Permittee shall, in consultation with the Department, reevaluate its local limits in order to prevent pass through or interference. Upon determination by the Department that any pollutant present causes pass through or interference, or exceeds established sludge standards, the Permittee shall establish new local limits or revise existing local limits as required by 40 CFR 403.5. In addition, the Department may require revision or establishment of local limits for any pollutant that causes an exceedance of the Water Quality Standards or established effluent limits, or that causes whole effluent toxicity. The determination by the Department shall be in the form of an Administrative Order. In order to develop these local limits, the Department will provide environmental criteria or limits for the various pollutants of concern.

The Department may modify this permit to incorporate additional requirements relating to the establishment and enforcement of local limits for pollutants of concern. Any permit modification is subject to formal due process procedures pursuant to state and federal law and regulation.

WASTEWATER PERMIT REQUIRED

RCW 90.48 and WAC 173-216-040 require SIUs to obtain a permit prior to discharge of industrial waste to the Permittee's sewerage system. This provision prohibits the POTW from accepting industrial wastewater from any such dischargers without authorization from the Department.

REQUIREMENTS FOR ROUTINE IDENTIFICATION AND REPORTING OF INDUSTRIAL USERS

The NPDES permit requires non-delegated POTWs to "take continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant industrial users (PSIUs) discharging to the Permittee's sewerage system". Examples of such routine measures include regular review of business tax licenses for existing businesses and review of water billing records and existing connection authorization records. System maintenance personnel can also be diligent during performance of their jobs in identifying and reporting as-yet unidentified industrial dischargers. Local newspapers, telephone directories, and word-of-mouth can also be important sources of information regarding new or existing discharges. The POTW is required to notify an industrial discharger, in writing, of their responsibilities regarding application for a State waste discharge permit and to send a copy of the written notification to the Department. The Department will then take steps to solicit a State waste discharge permit application.

DUTY TO ENFORCE DISCHARGE PROHIBITIONS

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet..

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition wastes with excessive BOD, petroleum based oils, or which result in toxic gases are prohibited to be discharged. The regulatory basis for these

prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

SUPPORT BY THE DEPARTMENT FOR DEVELOPING PARTIAL PRETREATMENT PROGRAM BY POTW

The Department has committed to providing technical and legal assistance to the Permittee in fulfilling these joint obligations, in particular assistance with developing an adequate sewer use ordinance, notification procedures, enforcement guidelines, and developing local limits and inspection procedures.

SPILL PLAN

The Department has determined that the Permittee stores a quantity of chemicals that have the potential to cause water pollution if accidentally released. The Department has the authority to require the Permittee to develop best management plans to prevent this accidental release under section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080.

The proposed permit requires the Permittee to develop and implement a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs.

The Permittee has developed a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs. The proposed permit requires the Permittee to update this plan and submit it to the Department.

OUTFALL EVALUATION

Proposed permit condition S.10. requires the Permittee to conduct an outfall inspection and submit a report detailing the findings of that inspection. The purpose of the inspection is to determine the condition of the discharge pipe and diffusers and to determine if sediment is accumulating in the vicinity of the outfall.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this permit be issued for 5 years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Metcalf and Eddy.

1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

Laws and Regulations(<http://www.ecy.wa.gov/laws-rules/index.html>)

Permit and Wastewater Related Information
(<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>)

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Water Pollution Control Federation.

1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(E2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on date and date in name of publication to inform the public that an application had been submitted and to invite comment on the reissuance (or issuance) of this permit.

The Department will publish a Public Notice of Draft (PNOD) on date, in name of publication to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Coordinator
Department of Ecology
Central Regional Office
15 West Yakima Avenue, Suite 200
Yakima, WA 98902

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the 30 day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least 30 days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within 30 days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

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CITY OF TONASKET

EXPIRATION DATE:

Further information may be obtained from the Department by telephone, 509/457-7105, or by writing to the address listed above.

This permit and fact sheet were written by Richard Marcley.

DRAFT

APPENDIX B--GLOSSARY

Acute Toxicity--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART-- An acronym for “all known, available, and reasonable methods of prevention, control, and treatment”.

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD₅--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD₅ is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

CBOD5 – The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celsius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD5 is given in 40 CFR Part 136.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring --Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial User-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I&I)--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

Pass through -- A discharge which exits the POTW into waters of the-State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Potential Significant Industrial User--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

- a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;
- b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)--

- 1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;

- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C--TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at <http://www.ecy.wa.gov/programs/wq/wastewater/index.html>

Mass Balance Dilution Factors					
Critical River Flow = 345 CFS					
ACUTE DILUTION FACTOR					
eff flow	eff temp	rw flow	rw conc	<u>final conc</u>	<u>dil factor</u>
0.318		8.63			28.1
CHRONIC DILUTION FACTOR					
eff flow	eff temp	rw flow	rw conc	<u>final conc</u>	<u>dil factor</u>
0.27		86.25			320.4

Spread of a plume from a point source in a river with boundary effects from the shoreline
based on the method of Fischer *et al.* (1979) with correction for the effective origin of effluent.

Revised 22-Feb-96

INPUT		
1. Effluent Discharge Rate (cfs):	Acute 0.32	chronic 0.27
2. Receiving Water Characteristics Downstream From Waste Input		
Stream Depth (ft):	3.00	3.00
Stream Velocity (fps):	0.64	0.64
Channel Width (ft):	165.00	165.00
Stream Slope (ft/ft) or Manning roughness "n":	0.01	0.01
0 if slope or 1 if Manning "n" in previous cell:	1	1
3. Discharge Distance From Nearest Shoreline (ft):	85	85
4. Location of Point of Interest to Estimate Dilution		
Distance Downstream to Point of Interest (ft):	30.3	303
Distance From Nearest Shoreline (ft):	85	85
5. Transverse Mixing Coefficient Constant (usually 0.6):	0.6	0.6
6. Original Fischer Method (enter 0) or <i>Effective Origin</i> Modification (enter 1)	0	0
OUTPUT		
1. Source Conservative Mass Input Rate		
Concentration of Conservative Substance (%):	100.00	100.00
Source Conservative Mass Input Rate (cfs*%):	31.80	26.70
2. Shear Velocity		
Shear Velocity based on slope (ft/sec):	#N/A	#N/A
Shear Velocity based on Manning "n":		
using Prasnun equations 8-26 and 8-54 assuming		
hydraulic radius equals depth for wide channel		
Darcy-Weisbach friction factor "f":	0.008	0.008
Shear Velocity from Darcy-Weisbach "f" (ft/sec):	0.020	0.020
Selected Shear Velocity for next step (ft/sec):	0.020	0.020
3. Transverse Mixing Coefficient (ft ² /sec):	0.037	0.037
4. Plume Characteristics Accounting for Shoreline Effect (Fischer <i>et al.</i> , 1979)		
Co	1.00E-01	8.43E-02
x'	6.35E-05	6.35E-04
y'o	5.15E-01	5.15E-01
y' at point of interest	5.15E-01	5.15E-01
Solution using superposition equation (Fischer eqn 5.9)		
Term for n= -2	0.00E+00	0.00E+00
Term for n= -1	0.00E+00	0.00E+00
Term for n= 0	1.00E+00	1.00E+00
Term for n= 1	0.00E+00	1.98E-161
Term for n= 2	0.00E+00	0.00E+00
Upstream Distance from Outfall to <i>Effective Origin</i> of Effluent Source (ft)	#N/A	#N/A
Effective Distance Downstream from Effluent to Point of Interest (ft)	30.30	303.00
x' Adjusted for <i>Effective Origin</i>	6.35E-05	6.35E-04
C/Co (dimensionless)	3.54E+01	1.12E+01
Concentration at Point of Interest (Fischer Eqn 5.9)	3.55E+00	9.43E-01
Unbounded Plume Width at Point of Interest (ft)	7.439	23.526
Unbounded Plume half-width (ft)	3.720	11.763
Distance from near shore to discharge point (ft)	85.00	85.00
Distance from far shore to discharge point (ft)	80.00	80.00
Plume width bounded by shoreline (ft)	7.44	23.53
Approximate Downstream Distance to Complete Mix (ft):	44,848	44,848
Theoretical Dilution Factor at Complete Mix:	996.226	1,186.517
Calculated Flux-Average Dilution Factor Across Entire Plume Width:	44.918	169.174
Calculated Dilution Factor at Point of Interest:	28.148	106.01399

CHRONIC MIXING ZONE DILUTION

CORMIX MIXING ZONE EXPERT SYSTEM
CORMIX-GI Version 4.3GT
HYDRO1:Version-4.3 April,2004

SITE NAME/LABEL:
DESIGN CASE: Tonasket
FILE NAME: Y:\WPFILES\MARCLEY\CINDY DRAFTS\Tonasket to
Using subsystem CORMIX1: Submerged Single Port Discharges
Start of session: 12/01/2005--11:02:08

SUMMARY OF INPUT DATA:

AMBIENT PARAMETERS:

Cross-section = bounded
Width BS = 50.29 m
Channel regularity ICHREG = 1
Ambient flowrate QA = 9.77 m³/s
Average depth HA = 1.19 m
Depth at discharge HD = 0.91 m
Ambient velocity UA = 0.1634 m/s
Darcy-Weisbach friction factor F = 0.0907
Calculated from Manning's n = 0.035
Wind velocity UW = 1 m/s
Stratification Type STRCND = U
Surface temperature = 18 degC
Bottom temperature = 18 degC
Calculated FRESH-WATER DENSITY values:
Surface density RHOAS = 998.5967 kg/m³
Bottom density RHOAB = 998.5967 kg/m³

DISCHARGE PARAMETERS:

Submerged Single Port Discharge

Nearest bank = left
Distance to bank DISTB = 19.81 m
Port diameter DO = 0.3048 m
Port cross-sectional area AO = 0.0730 m²
Discharge velocity UO = 0.10 m/s
Discharge flowrate QO = 0.007561 m³/s
Discharge port height HO = 0.15 m
Vertical discharge angle THETA = 2 deg
Horizontal discharge angle SIGMA = 90 deg
Discharge temperature (freshwater) = 25.60 degC
Corresponding density RHO0 = 996.8900 kg/m³
Density difference DRHO = 1.7067 kg/m³
Buoyant acceleration GPO = 0.0168 m/s²
Discharge concentration CO = 7.6 deg.C
Surface heat exchange coeff. KS = 0 m/s
Coefficient of decay KD = 0 /s

***** REGULATORY MIXING ZONE SUMMARY *****

The plume conditions at the boundary of the specified RMZ are as follows:

Pollutant concentration = 0.054411 deg.C
Corresponding dilution = 141.6
Plume location: x = 92.35 m
(centerline coordinates) y = 0.17 m
z = 0.91 m
Plume dimensions: half-width = 2.76 m
thickness = 1.19 m

At this position, the plume is NOT IN CONTACT with any bank.

ACUTE MIXING ZONE DILUTION

CORMIX MIXING ZONE EXPERT SYSTEM
CORMIX-GI Version 4.3GT
HYDRO1:Version-4.3 April,2004

SITE NAME/LABEL:

DESIGN CASE: Tonasket
FILE NAME: Y:\WPFILES\MARCLEY\CINDY DRAFTS\Tonasket to
Using subsystem CORMIX1: Submerged Single Port Discharges
Start of session: 12/01/2005--11:07:16

SUMMARY OF INPUT DATA:

AMBIENT PARAMETERS:

Cross-section = bounded
Width BS = 50.29 m
Channel regularity ICHREG = 1
Ambient flowrate QA = 9.77 m³/s
Average depth HA = 1.19 m
Depth at discharge HD = 0.91 m
Ambient velocity UA = 0.1634 m/s
Darcy-Weisbach friction factor F = 0.0907
Calculated from Manning's n = 0.035
Wind velocity UW = 1 m/s
Stratification Type STRCND = U
Surface temperature = 18 degC
Bottom temperature = 18 degC
Calculated FRESH-WATER DENSITY values:
Surface density RHOAS = 998.5967 kg/m³
Bottom density RHOAB = 998.5967 kg/m³

DISCHARGE PARAMETERS:

Submerged Single Port Discharge
Nearest bank = left
Distance to bank DISTB = 19.81 m
Port diameter DO = 0.3048 m
Port cross-sectional area AO = 0.0730 m²
Discharge velocity UO = 0.12 m/s
Discharge flowrate QO = 0.009005 m³/s
Discharge port height HO = 0.15 m
Vertical discharge angle THETA = 2 deg
Horizontal discharge angle SIGMA = 90 deg
Discharge temperature (freshwater) = 25.60 degC
Corresponding density RHO0 = 996.8900 kg/m³
Density difference DRHO = 1.7067 kg/m³
Buoyant acceleration GPO = 0.0168 m/s²
Discharge concentration CO = 7.6 deg.C
Surface heat exchange coeff. KS = 0 m/s
Coefficient of decay KD = 0 /s

***** REGULATORY MIXING ZONE SUMMARY *****

The plume conditions at the boundary of the specified RMZ are as follows:

Pollutant concentration = 0.370396 deg.C
Corresponding dilution = 20.5
Plume location: x = 9.24 m
(centerline coordinates) y = 0.20 m
z = 0.91 m
Plume dimensions: half-width = 0.90 m
thickness = 0.63 m

At this position, the plume is NOT IN CONTACT with any bank.

Temperature:

Mass Balance Temperature Factors				
Okanogan R.		Critical River Flow = 345 CFS		
CHRONIC DILUTION FACTOR				
eff flow	eff temp	Factor	rw conc	<u>final conc</u>
0.318	25.6	44.7	26.4	<u>26.394</u>
Decrease in Temperature 0.006 < 0.3				

Mass Balance Temperature Factors				
Okanogan R.		Critical River Flow = 345 CFS		
CHRONIC DILUTION FACTOR				
eff flow	eff temp	Factor	rw conc	<u>final conc</u>
0.318	25.6	44.7	17.9	<u>17.954</u>
Increase in Temperature 0.054 < 1.12				

pH Considerations:

Calculation of pH of a mixture of two flows. Based on the procedure in EPA's DESCON program (EPA, 1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington D.C.)

Based on Lotus File PHMIX2.WK1 Revised 19-Oct-93

INPUT		
	Efluent @ Max pH	Efluent @ Min pH
1. DILUTION FACTOR AT CHRONIC MIXING ZONE BOUNDARY	141.600	141.600
1. UPSTREAM/BACKGROUND CHARACTERISTICS		
Temperature (deg C):	26.40	26.40
pH:	8.90	8.90
Alkalinity (mg CaCO3/L):	50.00	50.00
2. EFFLUENT CHARACTERISTICS		
Temperature (deg C):	25.60	25.60
pH:	9.00	6.00
Alkalinity (mg CaCO3/L):	199.00	199.00
OUTPUT		
1. IONIZATION CONSTANTS		
Upstream/Background pKa:	6.34	6.34
Efluent pKa:	6.35	6.35
2. IONIZATION FRACTIONS		
Upstream/Background Ionization Fraction:	1.00	1.00
Efluent Ionization Fraction:	1.00	0.31
3. TOTAL INORGANIC CARBON		
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	50.14	50.14
Efluent Total Inorganic Carbon (mg CaCO3/L):	199.44	640.99
4. CONDITIONS AT MIXING ZONE BOUNDARY		
Temperature (deg C):	26.39	26.39
Alkalinity (mg CaCO3/L):	51.05	51.05
Total Inorganic Carbon (mg CaCO3/L):	51.19	54.31
pKa:	6.34	6.34
pH at Mixing Zone Boundary:	8.90	7.54

Fecal Coliform Bacteria

CHRONIC DILUTION FACTOR			Fecal Coliform		
eff flow	#'s/ ml	rw flow	rw #'s/ml	final conc	dil factor
0.318	200	44.7	61.5	62.478	141.6

Ammonia

Freshwater un-ionized ammonia criteria based on EPA Gold Book
(EPA 440/5-86-001).

Based on Lotus File NH3FRESH.WK1 Revised 19-Oct-93

INPUT	
1. Temperature (deg C; 0<T<30):	25.6
2. pH (6.5<pH<9.0):	8.87
3. Total Ammonia (ug N/L):	170.0
4. Acute TCAP (Salmonids present- 20; absent- 25):	20
5. Chronic TCAP (Salmonids present- 15; absent- 20):	15
OUTPUT	
1. Intermediate Calculations:	
Acute FT:	1.00
Chronic FT:	1.41
FPH:	1.00
RATIO:	16
pKa:	9.23
Fraction Of Total Ammonia Present As Un-ionized:	30.5599%
2. Sample Un-ionized Ammonia Concentration (ug/L as NH3-N):	52.0
3. Un-ionized Ammonia Criteria:	
Acute (1-hour) Un-ionized Ammonia Criterion (ug/L as NH3-N):	213.7
Chronic (4-day) Un-ionized Ammonia Criterion (ug/L as NH3-N):	29.1
4. Total Ammonia Criteria:	
Acute Total Ammonia Criterion (ug/L as NH3-N):	699
Chronic Total Ammonia Criterion (ug/L as NH3-N):	95

Reasonable Potential for Ammonia to Exceed Water Quality Criteria

REASONABLE POTENTIAL				CALCULATIONS													
This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98 (GB)				State Water Quality Standard		Max concentration at edge of...											
				Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	LIMIT REQ'D?	Effluent percentile value		Max effluent conc. measured (metals as total recoverable)	Coeff Variation	# of samp	Multiplier	Acute D'l'n Factor	Chronic D'l'n Factor	
Parameter	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Conc (metals as dissolved)	ug/L	ug/L	ug/L	ug/L		Ph		ug/L	CV	s	n			
Parameter	Acute	Chronic	ug/L	ug/L	ug/L	ug/L	ug/L										
AMMONIA	0.95	0.95	0.0100	95.00	699.00	29.91	41.59	NO	0.95	0.224	170.00	0.60	0.55	2	3.79	21	142

APPENDIX D--RESPONSE TO COMMENTS